strategies for improving service quality on customer perceptions of service quality. Survey results and related evidence of customer satisfaction with cellphone service quality are summarized below in the section on mobile telecommunications market performance.[338]

### 6. Mobile Data Services and Applications

139. As documented in the *Ninth Report* and previous reports, the major mobile telephone carriers and other mobile data providers have progressively introduced a wide variety of mobile data services and applications.[339] Currently, the largest segment of the mobile data market consists of handset-based applications marketed to consumers primarily as an add-on to mobile voice service, including text messaging ("SMS"), multimedia messaging services ("MMS") such as photo messaging, and entertainment applications such as ringtones and games. A second market segment consists of monthly mobile Internet access service packages for customers who wish to connect to wireless networks primarily or exclusively for data, rather than voice use, and who typically access the Internet through laptops or Personal Digital Assistants ("PDAs").

140. In the past year carriers have continued to expand and enhance their mobile data offerings. An example is the continued rollout of television services on cellphones. As discussed in the *Ninth Report*, Sprint PCS was the first U.S. mobile carrier to offer a live video programming service for mobile phones called MobiTV.[340] The service is powered onto cellphones by a privately-held California company called Idetic Inc., which streams the programs onto the phones via the Internet from servers that first convert the TV signals into digital files.[341] The service enables mobile subscribers to watch real-time news, sports, and entertainment programming and other video content from a variety of cable television channels. As with earlier applications, the introduction of a new data service by one carrier has prompted other carriers to begin offering competing services. For example, MobiTV was launched on AT&T Wireless's mMode data service in late 2004, prior to the company's acquisition by Cingular, and in early 2005 Cingular also began offering MobiTV through its Media Net service.[342] Like Sprint, Cingular offers the service for a fixed monthly fee as an add-on to voice service. Sprint has also improved its wireless TV service by adding new channels to its roster of live television programming and by offering a second type of service, called Sprint TV, which provides specially produced short clips from major networks.[343]

141. Verizon Wireless has extended the range of services provided over its EV-DO network to include video on demand and other multimedia services. When it began commercial operation in late 2003, the EV-DO network was used to provide Verizon's BroadbandAccess wireless Internet access service for business customers and other heavy data users, and could be accessed only via a special modem card inserted into a laptop computer.[344] In early 2005, Verizon Wireless introduced 3G handsets that can access the EV-DO network and launched VCAST, the country's first wireless multimedia service

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[338] *See* Section VI.C, Quality of Service, *infra*.

[339] *See Eighth Report*, at 14843-14856; *Ninth Report*, at 20659-20661.

[340] *Ninth Report*, at 20660.

[341] Walter S. Mossberg, *Watching TV on Your Cellphone*, WALL STREET JOURNAL, Sept. 1, 2004, p. D7 ("*Watching TV on Your Cellphone*").

[342] *Cingular Goes Live With MobiTV*, News Release, Cingular, Jan. 25, 2005.

[343] *Sprint Offers Fox News Channel*, WALL STREET JOURNAL, Apr. 19, 2005; *Watching TV on Your Cellphone*.

[344] Walter S. Mossberg, *Verizon Devices Use High-Speed Network for Voice, Web, E-Mail*, WALL STREET JOURNAL, Dec. 16, 2004, p. B1 ("*Verizon Devices Use High-Speed Network*").

to be provided over a next-generation network using EV-DO technology.[345] VCAST customers can use the new 3G handsets to access the EV-DO network for a wide range of content, including news programming and short, made-for-mobile episodes of TV programs. For a fixed monthly fee on top of what they pay for their regular Verizon calling plan, VCAST customers get unlimited access to Verizon's basic video news clips service and unlimited browsing of Verizon's "Mobile Web" news and information service. Premium content is available for an additional cost, including 3-D games, music videos, and other premium channels.

142. Verizon Wireless is hoping to leverage the high-speed capability of EV-DO technology in an effort to differentiate its wireless Internet access service and multimedia service from rival offerings. With speeds that are three to five times as fast as the typical speeds available over cellphone networks using older technologies, Verizon's EV-DO network enables laptop users to download files, play streaming video and audio, and receive e-mails at speeds that are comparable to what many users get from fixed broadband connections such as DSL.[346] Similarly, compared to rival offerings based on slower network technologies, the EV-DO capabilities of Verizon's new 3G phones make viewing streaming video and downloading various other applications on cellphones feel more like a broadband experience on a personal computer.[347] As noted in the *Ninth Report*, the slow speeds offered by earlier wireless network technologies adversely affect the viewing quality of video streamed onto cellphones by reducing the rate at which frames are shown.[348]

143. Although Verizon has taken the lead with regard to the deployment of a broadband wireless data network, Sprint PCS continues to be the market leader in pre-broadband consumer wireless data as measured by the contribution of data to overall ARPU.[349] In the first quarter of 2005, data accounted for 9.8 percent of Sprint's ARPU, followed by T-Mobile (7.6 percent), Cingular (7.5 percent), Verizon Wireless (6.3 percent), and Nextel (4.5 percent).[350] One reason the contribution of data to Sprint's overall ARPU is comparatively high appears to be that a relatively large share of Sprint's total customer base use data services. Sprint reported nearly 7.7 million direct wireless data subscribers, or about 43 percent of its total direct customers, at the end of the fourth quarter of 2004, including 6.2 million Vision subscribers.[351] In comparison, both Cingular and Verizon Wireless have reported that more than a third of their customers are data users.[352]

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[345] *Id.*; *On-Demand in the Palm of Your Hand: Verizon Wireless Launches "VCAST" – Nation's First and Only Consumer 3G Multimedia Service*, News Release, Verizon Wireless, Jan. 7, 2005; *Now Playing on a Cell Phone Near You: Video Clips, Music Videos and 3D Games*, News Release, Verizon Wireless, Jan. 31, 2005.

[346] Walter S. Mossberg, *Verizon is Crossing the U.S. With Speedy, True Wireless Access*, WALL STREET JOURNAL, Apr. 8, 2004, p. B1.

[347] *Verizon Devices Use High-Speed Network.*

[348] *Ninth Report*, at 20660; *see also*, *Watching TV on Your Cellphone*; *Verizon Devices Use High-Speed Network*; and Christopher Rhoads, *Cellphones Become 'Swiss Army Knives' as Technology Blurs*, WALL STREET JOURNAL, Jan. 4, 2005, p. B1.

[349] *Ninth Report*, at 20660.

[350] *1Q05 Trend Tracker*, at 25. *See,also*, Daniel Henriques *et al.*, *The Quarter in Pictures – 1Q05 U.S. Telecom Services Review*, Goldman Sachs, Global Investment Research, at 24 (showing that Sprint remains the data market leader as measured by the contribution of data to service revenue, followed by Cingular, Verizon, and Nextel).

[351] *Sprint Reports Fourth Quarter and Full-Year 2004 Results*, News Release, Sprint, Feb. 3, 2005, at 1 and 4.

[352] *Verizon Reports Strong 4Q and 2004 Results, Driven by Wireless Revenue Growth, Solid Cash Flows and Margins*, News Release, Verizon Communications Inc., Jan. 27, 2005, at 7; *First Quarter 2005 Financial and Operational Results*, Presentation, Cingular Wireless, Apr. 20, 2005, at 13.

144. Another important development is the move to extend inter-carrier operability to multimedia messaging services such as photo and video messaging. As noted in the *Ninth Report*, the introduction and progressive implementation of inter-carrier operability of SMS has been credited with stimulating the growth of text messaging in the U.S. mobile market.[353] As with SMS prior to the introduction of inter-carrier operability, initially U.S. mobile subscribers were capable of exchanging photo and video messages only with subscribers on the same carrier's network. In October 2004, CTIA announced that wireless carriers have reached an agreement to provide consumers with MMS interoperability so that subscribers on different networks can exchange such multimedia messages.[354] To this end, an industry working group, called the Inter-Carrier MMS Working Group, established a set of guidelines designed to allow wireless carriers to phase-in interoperability of photo and video messaging services over time. The working group began meeting in May 2004 with the goal of identifying a common set of features that could be supported by all participating carriers. Verizon Wireless has already signed interoperability agreements with select wireless carriers, including Cingular Wireless, U.S. Cellular, and Leap Wireless, thereby allowing customers with cameraphones to send photos, video clips, and audio files to subscribers on another carrier's network.[355] Verizon Wireless believes that such inter-carrier agreements will encourage the growth of picture messaging in the same way that inter-carrier text messaging spurred the growth of SMS.

## V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET

145. A mobile carrier can exercise market power only to the extent that mobile subscribers do not respond to price increases or other adverse competitive effects. If, to the contrary, enough consumers are sufficiently well-informed to take prices and other non-price factors into account when choosing their service provider, and likewise, if enough consumers have the ability and propensity to switch service providers in response to an increase in price or other harmful conduct, then the carrier will have an incentive to compete on price and non-price factors. Consumer behavior will be more effective in constraining market power when the transaction costs subscribers incur in choosing and switching carriers are low. Transaction costs depend on, among other factors, subscribers' access to and ability to use information, and costs and barriers to switching carriers.

### A. Access to Information on Mobile Telecommunications Services

146. Wireless consumers continue to demand more information on the availability and quality of mobile telecommunications services, and numerous third parties have been responding to this demand by compiling and reporting such information. The *Eighth Report* enumerated the considerable sources of information available to consumers, including publications such as *Consumer Reports*, trade associations, marketing and consulting firms, and several web sites dedicated to giving consumers an overview and comparison of the mobile telephone services available in their area.[356] These sources continue to update consumers on the wireless service options available to them. For example, the February 2005 issue of *Consumer Reports* magazine published the results of a new customer satisfaction survey on mobile telephone service.[357]

147. In addition, the wireless industry itself has responded to this demand by launching various initiatives designed to educate consumers and help them make informed choices when purchasing

[353] *Ninth Report*, at 20661.

[354] *Largent Announces Landmark MMS Interoperability Pact*, News Release, CTIA, Oct. 26, 2004.

[355] Susan Rush, *Verizon Signs Another MMS Interop Partner*, WIRELESS WEEK, May 23, 2005.

[356] *See Eighth Report*, at 14826.

[357] *Cellular Service*, CONSUMER REPORTS, Feb. 2005, at 18.

wireless services. One early example of such an initiative, the voluntary "10-Point Consumer Code" sponsored by CTIA, was discussed in the *Ninth Report*.[358] As noted above in Section IV.B.5, a more recent example is the interactive "Personal Coverage Check" feature which T-Mobile added to its Web site to enable customers to check the quality of network coverage where they live and work before they purchase service.

### B. Consumer Ability to Switch Service Providers

#### 1. Churn

148. Churn refers to the number of customers an operator loses over a given period of time. Mobile telephone operators usually express churn in terms of an average percent churn per month. For example, an operator might report an average monthly churn of 2 percent in a given fiscal quarter. In other words, on average, the operator lost 2 percent of its customers in each of the quarter's three months.

149. Most carriers report churn rates between 1.5 percent and 3.0 percent per month,[359] showing a slight decline over the past year.[360] However, this level still creates significant challenges for the industry. One analyst wrote, "Monthly churn rates are so high that gross adds have been running about three times higher than net adds. In other words, for every three new customers the national carriers bring in, they are losing two, on average."[361] Another analyst described churn as "the problem of this industry, wiping out [redacted]% of the industry revenue."[362] Consistent with findings in previous reports,[363] customers cite service pricing and network quality as the main reasons for changing providers.[364]

#### 2. Local Number Portability

150. Local number portability (LNP) refers to the ability of users of telecommunications services to retain, at the same location, existing telecommunications numbers when switching from one telecommunications carrier to another.[365] Thus, subscribers can port numbers between two CMRS carriers (intramodal porting) or between a CMRS and wireline carrier (intermodal porting). Under the Commission's rules and orders, covered CMRS carriers operating in the 100 largest Metropolitan

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[358] *Ninth Report*, at 20662.

[359] *US Wireless Matrix 4Q04*, at 14.

[360] *Id.*, at 4. See also, *1Q05 Trend Tracker*, at 24 ("Churn continues to slowly trend downward"). One analyst attributes this decline to "(1) greater industry maturity - many customers have already switched several times and are settling with the carrier most suitable for their needs; (2) industry structure rationalization and larger size - carriers seem reluctant to engage in a price war that would result in repricing a very large base of incumbent subscribers; and (3) less perceived differentiation terms of service and network quality." Jason Armstrong *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Apr. 22, 2005, at 2.

[361] Simon Flannery and Vance Edelson, *Wireless Carriers Susceptible to Slowing Industry Growth*, Morgan Stanley, Equity Research, May 25, 2005, at 1.

[362] Timothy Horan *et al.*, *Raising Wireless Subscriber; Profitability Outlook Improving*, CIBC World Markets, Equity Research, May 12, 2005, at 4.

[363] *See Sixth Report*, at 13372-73; *Seventh Report*, at 13007; *Eighth Report*, at 14817; *Ninth Report*, at 20663.

[364] *See, e.g.*, COMMUNICATIONS DAILY, Nov. 8, 2004, at 7 (citing a Harris Interactive report); Simon Flannery and Vance Edelson, *Strong Showing for Bells in Annual Corporate Survey*, Morgan Stanley, Equity Research, Jun. 22, 2004, at slide 10; Phil Cusick and Richard Choe, *Characteristics of Wireless Subscribers and Non-Users*, Bear Stearns, Equity Research, Feb. 2005, at 26-28.

[365] 47 C.F.R. § 52.21(l).

*Statistical Areas (MSAs) were required to begin providing number portability by November 24, 2003.*[366] CMRS carriers outside of the top 100 MSAs were required to be LNP-capable by May 24, 2004.[367]

151. Wireless number porting activity since the advent of porting has been significant. Overall, approximately 11.3 million wireless subscribers ported their numbers to another wireless carrier from December 2003 through April 2005.[368] Monthly rates of intramodal porting activity remained fairly steady during this period, with 713,000 ports in January 2004 and 735,000 in April 2005.[369] Monthly levels of intermodal porting from wireline carriers to CMRS carriers significantly increased over 2004, from an average rate of 76,000 ports per month in the first six months of 2004 to an average rate of approximately 99,000 in the second half of the year, suggesting an increase in the extent of intermodal competition.[370] Intermodal porting from wireless to wireline carriers, however, remained steady at 1000-2000 ports per month.[371]

152. We noted in the *Ninth Report* that the advent of porting in late 2003 did not lead to a significant increase in wireless churn, but did appear to have had an impact on service quality by inducing carriers to engage in aggressive customer retention efforts.[372] In light of the steady rates of intra-modal porting from December of 2003 to October of 2004, and the slight decline in churn during 2004, we again conclude that porting has not caused churn to significantly increase, but is likely contributing to additional quality measures being taken by carriers to retain customers.[373]

## VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE

153. The structural and behavioral characteristics of a competitive market are desirable not as ends in themselves, but rather as a means of bringing tangible benefits to consumers such as lower prices, higher quality and greater choice of services. Such consumer outcomes are the ultimate test of effective competition. To determine if these goals are met and whether there is still effective competition in the market, in this section we analyze various metrics including pricing levels and trends, subscriber growth and penetration, minutes of use ("MOU"), innovation and diffusion of services, and quality of service.

### A. Pricing Levels and Trends

#### 1. Pricing Trends.

154. Equity analysts and other industry observers continue to describe wireless price competition in the United States as intense, so much so that one analyst said, "even a carrier with large

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[366] 47 C.F.R § 52.31(a); Verizon Wireless's Petition for Partial Forbearance From Commercial Mobile Radio Services Number Portability Obligation and Telephone Number Portability, WT Docket No. 01-184, Telephone Number Portability, CC Docket No. 95-116, *Memorandum Opinion and Order*, 17 FCC Rcd 14972, 14986, para. 31 (2002) ("*Verizon Wireless LNP Order*").

[367] *Verizon Wireless LNP Order*, 17 FCC Rcd at 14986, para. 31.

[368] Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2004*, Federal Communications Commission, Aug. 2005, at 35.

[369] *Id.*

[370] *Id.*

[371] *Id.*

[372] *Ninth Report*, at 20664.

[373] *See US Wireless Matrix 4Q04*, at 1, 14; Phil Cusick and Richard Choe, *Characteristics of Wireless Subscribers and Non-Users*, Bear Stearns, Equity Research, Feb. 2005, at 5-6 (noting that Verizon, Nextel and U.S. Cellular "have focused on customer service and satisfaction as an effective mechanism to mitigate churn."); CTIA Comments, at 20.

*market share in an area has very little pricing power."*[374] However, wide variations in the non-price terms and features of wireless service plans make it difficult to characterize the price of mobile telephone service, and consequently it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner.[375] As documented in previous reports, there is ample evidence of a sharp decline in mobile telephone prices in the period since the launch of PCS service. One analyst estimated that the average per-minute cost of wireless calling plunged over 65 percent in the past four years alone.[376]

155. Two indicators of mobile telephone pricing show that the long-term decline in the cost of mobile telephone services continued through 2004.[377] One study of mobile telephone pricing shows a slight increase in the cost of mobile telephone services in 2004.

156. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities increased 1.8 percent in 2004.[378] The average cost of monthly service[379] – which was calculated across four typical usage plans (200, 500, 800 and 1100 minutes) – increased from $43.37 in January 2004 to $44.13 in January 2005 [380]

157. Another source of price information is the cellular telephone services component of the Consumer Price Index ("Cellular CPI") produced by the United States Department of Labor's Bureau of Labor Statistics ("BLS").[381] Cellular CPI data is published on a national basis only.[382] From 2003 to

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[374] Phil Cusick and Richard Choe, *Wireless 101: A U.S. Wireless Industry Primer*, Bear Stearns, Equity Research, June 2005, at 10.

[375] *See Fourth Report*, at 10164-10165.

[376] David Pringle, *Slower Growth Hits Cellphone Services Overseas*, WALL STREET JOURNAL, May 23, 2005 (citing a Yankee Group survey).

[377] Fees for actual service are only one element of cost that consumers face. One analyst estimated that the average price a consumer paid for a wireless handset had fallen from $128 in 1999 to $88 in 2003, a decline of 31 percent. *Likelihood Of Purchasing New Cell Phone Is On The Rise*, News Release, J.D. Powers and Associates, Oct. 23, 2003.

[378] *Econ One Wireless Survey: Costs Nudge Down in December*, News Release, Econ One, Jan. 12, 2004. The survey is based on an analysis of pricing plan data collected from carriers' websites. *Transcript*, at 78.

[379] This does not include any additional charges for roaming or long-distance service.

[380] *Econ One Wireless Survey: Service Costs Stay Flat*, News Release, Econ One, Feb. 17, 2004; *Econ One Wireless Survey: Wireless Costs Decline*, News Release, Econ One, Feb. 22, 2005. The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used. In January 2004, Econ One modified the minute buckets in its analysis to "reflect increased consumer service usage." Instead of reporting cost of wireless service based on 50, 200, 500, and 800 MOUs per month, Econ One increased the buckets to 200, 500, 800 and 1100 MOUs per month. In addition, Econ One added service plans offered by Nextel Communications into its analysis. Thus, Econ One's analysis is not directly comparable to prior periods. *Econ One Wireless Survey: Service Costs Stay Flat*, News Release, Econ One, Feb. 17, 2004.

[381] *See* Appendix A, Table 7, *infra*. The Consumer Price Index ("CPI") is a measure of the average change over time in the prices paid by urban consumers for a fixed market basket of consumer goods and services. The basket of goods includes over 200 categories including items such as food and beverages, housing, apparel, transportation, medical care, recreation, education, and communications. The CPI provides a way for consumers to compare what the market basket of goods and services costs this month with what the same market basket cost a month or a year ago. Starting in December of 1997, this basket of goods included a category for cellular telephone services. All CPI figures discussed in this paragraph were taken from BLS databases found on the BLS Internet site at <http://www.bls.gov>. The index used in this analysis, the CPI for All Urban Consumers (CPI-U), represents about 87 percent of the total U.S. population. Bureau of Labor Statistics, *Consumer Price Index: Frequently Asked* (continued....)

2004, the annual Cellular CPI decreased by about 1.0 percent while the overall CPI increased by 2.7 percent. The Cellular CPI has declined 34 percent since December 1997, when BLS began tracking it.[383]

158. As a third pricing indicator, some analysts believe average revenue per minute ("RPM") is a good proxy for mobile pricing.[384] This is calculated by dividing a carrier's estimate of ARPU by its estimate of MOUs, yielding the revenue per minute that the carrier is receiving.[385] Using its estimates of industry-wide ARPU and MOUs, CTIA's survey indicates that RPM fell 12 percent between December 2003 and December 2004. In the ten years since 1994, RPM has fallen from $0.47 in December 1994 to $0.09 in December 2004, a decline of 82 percent.[386]

### 2. Average Revenue Per Unit

159. One financial metric widely used in analyzing the mobile telephone sector is average monthly revenue per subscriber (often referred to as average revenue per unit, or "ARPU"). CTIA's estimate of ARPU decreased almost continuously between December 1988 and December 1998, when it reached a low of $39.43.[387] However, since 1999, ARPU has been increasing, rising to $50.64 in December 2004, a 28 percent increase from the low of six years ago, but only a 1.5 percent rise from $49.49 in December 2003. This trend has continued even though per-minute prices declined throughout this period.[388] The recent ARPU increases may be due to a variety of factors, including the demand-stimulating effect of falling per-minute prices. In particular, if demand for mobile telephone service is elastic, increased usage will be sufficient to offset per-minute price declines, causing ARPU to rise in response to a drop in price.[389] Another possible factor is the adoption by wireless consumers of higher-priced calling plans.[390] Rising ARPU may also be due to increased use of data services by wireless

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*Questions* (visited July 11, 2005) <http://www.bls.gov/cpi/cpifaq.htm>. While the CPI-U is urban-oriented, it does include expenditure patterns of some of the rural population. *Transcript*, at 59. Information submitted by companies for the CPI is provided on a voluntary basis. *Transcript*, at 53.

[382] *Transcript*, at 50. The Cellular CPI includes charges from all telephone companies that supply "cellular telephone services," which are defined as "domestic personal consumer phone services where the telephone instrument is portable and it sends/receives signals for calls by wireless transmission." This measure does not include business calls, telephone equipment rentals, portable radios, and pagers. Bureau of Labor Statistics, *How BLS Measures Price Change for Cellular Telephone Service in the Consumer Price Index* (visited July 11, 2005) <http://www.bls.gov/cpi/cpifactc.htm>.

[383] From December 1997 compared to the annual index.

[384] *See US Wireless Matrix 4Q04*, at 44.

[385] Note that this version of ARPU is CTIA's "average monthly local bill" and does not include toll or roaming revenues where they are not priced into a calling plan. *See* note 387, *infra*.

[386] *See* Appendix A, Table 9, *infra*.

[387] *See* Appendix A, Table 1, *infra*. There are different ways of calculating ARPU. The measure used here, CTIA's "average local monthly bill," does not include toll or roaming revenues (CTIA calls it "the equivalent of 'local ARPU'"). *Dec 2004 CTIA Survey*, at 197. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, *see Dec 2004 CTIA Survey*, at 100, 198.

[388] *See* Section VI.A.1, Pricing Trends., *supra*.

[389] *See, e.g.*, Simon Flannery *et al.*, *Skating on Thin Ice: Lowering Industry View to Cautious*, Morgan Stanley, Equity Research, Jan.19, 2005, at 16 (showing elasticity of demand greater than one for the last four years).

[390] Regardless of whether customers use the large bundles of minutes included with such plans, the higher monthly access fees increase operators' ARPU figures.

subscribers.[391] As stated above, in the first quarter of 2005, data accounted for 9.8 percent of Sprint's ARPU, followed by T-Mobile (7.6 percent), Cingular (7.5 percent), Verizon Wireless (6.3 percent), and Nextel (4.5 percent).[392]

## B. Quantity of Services Purchased

### 1. Subscriber Growth

#### a. Mobile Telephony

160. Since the *Seventh Report*, in an effort to improve the accuracy of its estimate of U.S. mobile telephone subscribership, the Commission began analyzing information filed directly with the FCC. This information, the NRUF data,[393] tracks phone number usage information for the United States.[394] All mobile wireless carriers must report to the FCC which of their phone numbers have been assigned to end-users, thereby permitting the Commission to make more accurate estimates of subscribership.[395] In previous years, for purposes of this report, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.[396] While the Commission, for

[391] *See, e.g.*, Jason Armstrong, *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Apr. 22, 2005, at 2 ("ARPU strength [is] supported by rational pricing and increasing contribution from data").

[392] *1Q05 Trend Tracker*, at 25.

[393] Carriers began reporting NRUF data biannually beginning with the period ending June 2000. In addition, the Commission's local competition and broadband data gathering program, adopted in March 2000, provides more data on mobile subscribership. The FCC requires mobile wireless carriers with over 10,000 facility-based subscribers in a state to report the number of their subscribers in those states twice a year to the Commission. In their December 31, 2003 filings, operators reported that they served 157 million subscribers. *See* Appendix A, Table 2, *infra*. However, the Commission recognizes that its reporting rules result in some level of undercount of total industry subscribers since it does not count subscribers served by mobile telephone providers in states where the provider has fewer than 10,000 customers. *See* Local Competition and Broadband Reporting, *Report and Order*, 15 FCC Rcd 7717, 7743 (2000).

[394] When the North American Numbering Plan ("NANP") was established in 1947, only 86 area codes were assigned to carriers in the United States. Only 61 new codes were added during the next 50 years. But the rate of activation has increased dramatically since then. Between January 1, 1997 and December 31, 2000, 84 new codes were activated in the United States. Because the remaining supply of unassigned area codes is dwindling, and because a premature exhaustion of area codes imposes significant costs on consumers, the Commission has taken a number of steps to ensure that the limited numbering resources are used efficiently. Among other things, the Commission requires carriers to submit data on numbering resource utilization and forecasts twice a year. Federal Communications Commission, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. This information is submitted to the FCC on Form 502. *Id.*

[395] Federal Communications Commission, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. An assigned number is one that is in use by an end-user customer. *Id.*, at 3. Carriers also report other phone number categories, including: intermediate – numbers given to other companies; aging – numbers held out of circulation; administrative – numbers for internal uses; reserved – numbers reserved for later activation; and available – numbers available to be assigned. *Id.* Assigned numbers are not necessarily from facilities-based carriers. A reseller can assign a number to an end user. This does not double-count in the assigned total, since the facilities-based carrier only counts that number as an "intermediate" number given to the reseller. *Id.*

[396] *See Dec 2004 CTIA Survey*. The CTIA effort is a voluntary survey of both its member and non-member facilities-based providers of wireless service. CTIA asks majority owners of corporations to report information for the entire corporation, which helps eliminate double counting. To encourage honest reporting, the surveys are tabulated by an independent accounting firm under terms of confidentiality and are later destroyed. CTIA receives only the aggregate, national totals. Not all wireless carriers submit surveys, however. In order to develop an estimate of total U.S. wireless subscribership, CTIA identifies the markets which are not represented in the survey (continued....)

purposes of this report, now uses NRUF data as the basis for its estimate of mobile telephone subscribership, we continue to report the CTIA data as well for the purpose of comparison.[397]

161. As of December 2004, we estimate that there were 184.7 million mobile telephone subscribers,[398] up from 160.6 million at the end of 2003, which translates into a nationwide penetration rate of 62 percent.[399] This addition of 24.1 million subscribers was a 28 percent increase from the 18.8 million added in 2003, and an 80 percent increase over the 13.3 million added in 2002.[400] In the last three years alone, the total mobile telephone subscriber base has increased 30 percent.

162. CTIA's estimate for year-end 2004 was 182.1 million subscribers, a 15 percent increase over its estimate of 158.7 million subscribers as of year-end 2003.[401] These additions show similar surging subscriber growth, and the 2004 survey's increase of 23.4 million subscribers ties its previous high in 2000.[402]

163. According to a number of analysts, the main drivers of this high subscriber growth are the attractiveness of innovative service models such as prepaid and family plans - which target previously underserved markets such as youth, immigrants, and the credit-challenged - as well as wireless substitution.[403]

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responses. Then, CTIA uses third-party estimates or extrapolates from surrogate and/or historical data to create an estimate of subscribership for those markets. *See Eighth Report*, at 14813, note 211.

[397] The advantages of NRUF data over CTIA's survey are discussed in the *Seventh Report*, at 13004.

[398] Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2004*, Federal Communications Commission, Aug. 2005, at 12 (Table 1: Number Utilization by Carrier Type as of December 31, 2004); adjusted for porting using *Trends in Telephone Service*, Federal Communications Commission, Apr. 2005, at 8-15 (Table 8.10: Telephone Number Porting Activity Since Wireless Pooling Started). In NURF, carriers do not report numbers that have been ported to them. *See* Section V.B.2, Local Number Portability, *supra*. Therefore, in order to develop an estimate of wireless susbcribership, it is necessary to adjust the raw NRUF data to account for wireless subscribers who have transferred their wireline numbers to wireless accounts. Porting adjustments are developed from the telephone number porting database managed by the Local Number Portability Administrator, which is currently NeuStar, Inc. The database contains all ported numbers currently in service. It also contains information about when the number was most recently ported (to a carrier other than the carrier to which the number originally was assigned) or, in some cases, when the database was updated to reflect a new area code. *Trends in Telephone Service*, Federal Communications Commission, Apr. 2005, at 8-2 – 8-3.

[399] The nationwide penetration rate is calculated by dividing total mobile telephone subscribers by the total U.S. population. According to the Bureau of the Census, the combined population of the 50 states, the District of Columbia, and Puerto Rico as of July 1, 2004 was estimated to be 297.6 million. *See* U.S. Census Bureau, *National and State Population Estimates: Annual Population Estimates 2000 to 2004* (visited June 17, 2005) <http://www.census.gov/popest/states/tables/NST-EST2004-01.xls >. The number of subscribers refers to the number of separate wireless accounts. A particular individual may have more than one wireless account.

[400] *See Ninth Report*, at 20669.

[401] *See* Appendix A, Table 1, *infra*.

[402] *Id.*

[403] *Pay First; The Push Behind Prepaid.* At Sprint PCS, for example, such users are responsible for almost half of new subscription growth. Jesse Drucker, Almar Latour, and Dennis Berman, *Taking no Giants, Sprint Nextel Seeks to Exploit Wireless Growth*, WALL STREET JOURNAL, Dec. 16 2004, at A1. *See, also*, Simon Flannery and Vance Edelson, *Wireless Carriers Susceptible to Slowing Industry Growth*, Morgan Stanley, Equity Research, May 25, 2005, at 2; Timothy Horan et al., *Raising Wireless Subscriber; Profitability Outlook Improving*, CIBC World (continued....)

164. Digital subscribers made up approximately 97 percent of all wireless subscribers at the end of 2004,[404] leaving approximately 7 million analog-only mobile telephone subscribers.[405]

**b. Mobile Data**

165. The number of mobile data users appears to be rising both absolutely and as a percentage of the mobile telephone subscriber base. The *Ninth Report* cited one estimate that almost 25 percent of U.S. mobile subscribers can be considered casual data users, most of whom use SMS and some of whom use picture mail, download ring tones or do simple web surfing.[406] Based on figures reported by some of the nationwide carriers, it appears that the percentage of mobile telephone subscribers who use mobile data services has increased significantly in the past year. As noted previously in Section IV.B.6 on mobile data services, Cingular and Verizon have reported that about a third of their customers are mobile data users, while the number of data subscribers reported by Sprint in the fourth quarter of 2004 indicates that slightly more than 40 percent of its customers are mobile data users.[407] In addition, a recent survey by Yankee Group of 5,200 adults found that 33 percent of Americans between 25 and 34 text-message regularly, up from 24 percent in 2004.[408] Mobile data services are particularly popular among teenagers and young adults. According to the same Yankee Group survey, the rate of text messaging by people between the ages of 35 and 44 remained at about 25 percent in both years, while usage by people ranging in age from 18 to 24 grew to 62 percent from 52 percent in the same period.[409]

166. In contrast with text messaging and other handset-based mobile data applications, subscriber numbers for paging continue to drop. Using NRUF data, we estimate there were 8.5 million paging units in service as of the end of 2004, down 24 percent from 11.2 million units at the end of 2003, and down 40 percent from 14.1 million units at the end of 2002.[410]

**c. Satellite**

167. According to satellite industry analysis firm TelAstra, estimates place the number of subscribers to mobile satellite telephone services worldwide, including the United States, at 892,000 at

(Continued from previous page)
Markets, Equity Research, May 12, 2005, at 2; Daniel Henriques et al., *Global Telecom Weekly*, Goldman Sachs, Equity Research, Feb. 4, 2005, at 1.

[404] *US Wireless Matrix 4Q04*, at 18. *See, also*, Colette M. Fleming *et al.*, *Wireless 411*, UBS Warburg, Equity Research, Jan. 5, 2005, at 18 (also estimating 97 percent) ("*Wireless 411*"). CTIA found a similar rate: More than 96 percent of subscribers of responding carriers in its YE2004 survey were digital (CTIA estimated the digital percentage for its total estimate of subscribers at 94.6). *Dec 2004 CTIA Survey*, at 48-49.

[405] Based on digital penetration rates found in, *US Wireless Matrix 4Q04*, at 18. Subscribers that can access both the digital and analog networks of carriers are considered to be digital subscribers.

[406] *Ninth Report*, at 20670.

[407] *Verizon Reports Strong 4Q and 2004 Results, Driven by Wireless Revenue Growth, Solid Cash Flows and Margins*, News Release, Verizon Communications Inc., Jan. 27, 2005, at 7; *First Quarter 2005 Financial and Operational Results*, Presentation, Cingular Wireless, Apr. 20, 2005, at 13; *Sprint Reports Fourth Quarter and Full-Year 2004 Results*, News Release, Sprint, Feb. 3, 2005, at 1 and 4.

[408] Li Yuan, *Text Messages Sent by Cellphone Finally Catch on in U.S.*, WALL STREET JOURNAL, AUG. 11, 2005.

[409] *Id.*

[410] Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2004*, Federal Communications Commission, Aug. 2005, at 12 (Table 1: Number Utilization by Carrier Type as of December 31, 2004).

the end of 2004, up from the estimate of 885,000 subscribers cited in the *Ninth Report*.[411]

### 2. Minutes of Use

168. Wireless subscribers continue to increase the amount of time they communicate using their wireless phones. Average minutes-of-use per subscriber per month ("MOUs") jumped again in 2004, to 680 minutes, or more than 11 hours of use, for the average subscriber of a nationwide operator in the last quarter of the year.[412] This is an increase of 80 MOUs, or more than one hour of additional use, from a year earlier.[413] Sprint PCS, the nationwide operator with the highest MOUs, averaged just under 1,000 MOUs per month per subscriber.[414] According to CTIA, MOUs averaged 584 between June and December 2004, an increase of 15 percent from the average of 507 MOUs reported during the same period in 2003, and an increase of 37 percent from an average of 427 MOUs from the same period in 2002.[415]

169. Increasing MOUs are a result of the demand-stimulating effect of falling prices and the wider acceptance of and reliance upon wireless service.[416] One analyst attributed increasing MOUs to "increasing adoption of the wireless handset as the primary means of voice communications."[417]

### 3. Mobile Data Usage

170. Data on the use of handset-based mobile data applications are fragmentary and their availability varies with the particular type of application. By a number of indicators, however, handset-based mobile data applications have been gaining popularity among U.S. mobile subscribers. For example, the volume of SMS traffic continued to increase at a rapid pace in the past year. CTIA estimates that SMS traffic volume grew to 4.66 billion per month in December 2004, more than double the 2 billion messages per month reported in December 2003.[418] In addition to tracking the volume of SMS messages sent in June and December of each year, beginning with the second half of 2004 CTIA now collects SMS traffic volumes for the entire six-month period of its semi-annual survey. The reported SMS traffic volume for the period July through December 2004 was 24.7 billion messages.[419]

171. While text messaging continues to be the most widely used messaging service, the volume of photo messaging and other multimedia messaging services is also growing. Cingular reported that 30 million multimedia messages were sent or received by its customers in the first quarter of 2005, as

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[411] Private communication, TelAstra; *Ninth Report*, at 20670

[412] *US Wireless Matrix 4Q04*, at 26.

[413] *Id.* According to one survey, only 22 percent of wireless subscribers use all of their available minutes on a monthly basis, suggesting there is considerable potential for further growth. *Most Wireless Minutes Are Unused, Study Finds*, MOBILE PIPELINE NEWS, Aug. 5, 2004 (citing a study by telecom market research firm TNS Telecoms).

[414] *US Wireless Matrix 4Q04*, at 26.

[415] *See* Appendix A, Table 8, *infra*. CTIA aggregated all of the carriers' MOUs from July 1 through December 31, then divided by the average number of subscribers, and then divided by six.

[416] *See, e.g., Wireless 411*, at 45 ("[G]rowth in usage remains robust for the most part despite the already high levels. We believe this is a function of the lower effective price per minute charged").

[417] *Wireless Handsets*, Merrill Lynch, Equity Research, Jun. 4, 2004, at 9.

[418] Robert F. Roche, *CTIA's Wireless Industry Indices*, CTIA-The Wireless Association, June 2005, at 226-227.

[419] *Id.*

compared with four billion text messages.[420] Verizon's customers sent 41.4 million multimedia messages and 3.6 billion text messages during the same period.[421]

172. Entertainment applications such as ringtones and games also continued to grow in popularity. It is estimated that about 250 million ringtones were downloaded by U.S. cellphone users in 2004.[422] Cingular reported 50 million premium content downloads by its customers in the first quarter of 2005, and Verizon Wireless reported 34.1 million content downloads in the same period.[423]

173. The results of an online market research survey designed to assess current usage of mobile data services are broadly consistent with the picture emerging from the aggregate data on mobile data usage cited above.[424] Online interviews were conducted with 1000 young consumers ranging in age from 13 to 34 in March 2005. Respondents were asked to estimate how often they used certain wireless phone features or applications in the past month. Text messaging was the most commonly used service, with 49 percent of the respondents using text messaging at least once in the previous month. Taking a photo with a phone was the next most popular service, garnering 30 percent usage in the previous month. Instant messaging was the third most popular service, at 20 percent usage, followed by web browsing (19 percent), photo messaging (19 percent), downloading ringtones (19 percent), using email (16 percent), receiving traffic or news alerts (13 percent), downloading a game to be played (12 percent), taking a video with a phone (10 percent), and video messaging (8 percent).

### 4. Sub-National Penetration Rates

174. NRUF data is collected on a small area basis and thus allows the Commission to compare the spread of mobile telephone subscribership across different areas within the United States.[425] EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephone penetration rates for two reasons.[426] First, the defining aspect of mobile telephone is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far

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[420] John Byrne *et al.*, *Wireless Telecom Investor*, Number 208, Kagan Research, LLC, June 6, 2005, at 5 ("*Kagan Wireless Newsletter*").

[421] *Id.*

[422] Gary Strauss, *Cell Phone Ringtones Dial Into Pop Culture*, USA TODAY, June 2, 2005.

[423] *Kagan Wireless Newsletter*, at 5.

[424] *Next Generation Wireless Multimedia Services*, TMNG Market Research, July 2005, at 3 and 5.

[425] NRUF data is collected by the area code and prefix (NXX) level for each carrier, which enables the Commission to approximate the number of subscribers that each carrier has in each of the approximately 18,000 rate centers in the country. Rate center boundaries generally do not coincide with county boundaries. However, for purposes of geographical analysis, the rate center data can be associated with a geographic point, and all of those points that fall within a county boundary can be aggregated together and associated with much larger geographic areas based on counties, for which population and other data exists. Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining unlike areas such as rate center areas and counties.

[426] There are 172 EAs, each of which is an aggregation of counties. *See* Kenneth P. Johnson, *Redefinition of the EA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75 (*Redefinition of the EA*). For its spectrum auctions, the FCC has defined four additional EAs: Guam and the Northern Mariana Islands (173); Puerto Rico and the U.S. Virgin Islands (174); American Samoa (175); and Gulf of Mexico (176). *See* FCC, *FCC Auctions: Maps* (visited Mar. 25, 2002) <http://wireless.fcc.gov/auctions/data/maps.html>. In November 2004, the Bureau of Economic Analysis released updated definitions of EAs; however, for this report we use the previous release of definitions. *See New BEA Economic Areas For 2004*, Bureau of Economic Analysis, Nov. 17, 2004.

*as possible, the place of work and the place of residence of its labor force.*[427] Thus, an EA would seem to capture the market where the average person would shop for and purchase his or her mobile phone most of the time – near home, near the workplace, and all of the places in between. Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas.[428] In other words, a mobile telephone subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber's place of residence or usage (but generally still in the same EA).[429]

175. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA population density, can be seen in Appendix A, Table 3.[430] The rates range from a high of 80 percent in the Atlanta, GA-AL-NC EA (EA 40) to a low of 37 percent in the San Angelo, TX EA (EA 129). 151 EAs (half as many more than in 2003), with a combined population of 271 million, have penetration rates of over 50 percent. Sixteen EAs, with a combined population of 60 million, have penetration rates of over 70 percent (there were none in 2003) . The Anchorage, AK EA (EA 171), with the lowest population density, had a penetration rate of 51 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 72 percent. As previously stated, based on an analysis of NRUF data, the national penetration rate is 62 percent.

### C. Quality of Service

176. To evaluate the quality of service, this section summarizes the results of relevant consumer satisfaction surveys and reports on the incidence of customer complaints. When examining such indicators of the quality of mobile telephone service, it is important to keep in mind that they are based on consumers' subjective perceptions of service quality. There are several points to note in this regard. First, mobile telecommunications service is an experience good, and therefore the quality of the product is unknown until the consumer actually uses it. Second, the perceived quality of any good or service depends partly on its price, and a consumer's evaluation of the relationship between price and quality determines his or her level of satisfaction. As stated in one survey of cellular customer satisfaction, "When customers make a purchase, they are choosing a price/quality package that they expect to meet their needs and desires. Ordinarily, higher price is associated with higher quality."[431] Third, consumer perceptions can change independently of actual changes in network performance as their expectations evolve.

177. Finally, service quality in this market is dependent on when and where the service is

[427] *Redefinition of the EA*, at 75.

[428] According to one analyst, wireless carriers assign numbers so as to minimize the access charges paid to local wireline companies. *See* Linda Mutschler *et al.*, *Wireless Number Portability*, Merrill Lynch, Equity Research, Jan 9, 2003, at 8 ("For wireless operators, the standard practice is to aggregate phone numbers within the same area code onto the same or several rate centers, whose physical locations would result in the least amount of access charges paid to ILECs. Therefore, in each market, wireless operators are present in only a small number of rate centers. According to our industry sources, this percentage is probably below 20%, and could be meaningfully lower than 20%.").

[429] "Once the NPA-NXX (i.e., 212-449) is assigned to the wireless carrier, the carrier may select any one of its NPA-NXXs when allocating that number to a particular subscriber. Therefore, with regard to wireless, the subscriber's physical location is not necessarily a requirement in determining the phone number assignment – which is very different from how wireline numbers are assigned." Linda Mutschler *et al.*, *US Wireless Services: Wireless Number Portability – Breaking Rules*, Merrill Lynch, Equity Research, Feb. 28, 2003, at 3.

[430] *See also,* Appendix B, Map 4, *infra*.

[431] Vivian Witkind Davis, *Consumer Utility Benchmark Survey: Consumer Satisfaction and Effective Choice for Cellular Customers*, The National Regulatory Research Institute at The Ohio State University, Nov. 2003, at 4.

used. In this regard, service quality concerns may stem from customer expectations that mobile phone service should be available at all times and at all points within the coverage area. Many mobile phone providers make maps of their service areas available to their subscribers either at their service stores or on their websites. These maps typically contain disclaimers to the effect that the maps only show approximate coverage areas and are not a guarantee of coverage, or warnings that even in areas with a strong signal, service may be adversely affected by the volume of traffic on the network.[432] Nevertheless, customers may expect to be able to complete all calls and use all services within the entire service areas shown on the maps. When the full range of expected services is not available, consumer expectations may not be met.

178. According to the J.D. Power and Associates 2004 U.S. Wireless Regional Customer Satisfaction Index Study ("Wireless CSI Study"), overall satisfaction with wireless service providers has increased five percent over 2003, the first time a significant increase has been achieved on a year-to-year basis in three years.[433] The Wireless CSI Study measures customer satisfaction based on 42 specific service-related measures grouped into six key factors that impact overall wireless carriers performance. These six factors are, in order of importance: call performance and reliability (26 percent); customer service (17 percent); service plan options (17 percent); brand image (14 percent); cost of service (14 percent); and billing (12 percent). The study also ranks carriers across six regions in the United States. The 2004 Wireless CSI Study is based on responses from 21,700 households.

179. J.D. Power and Associates interprets the results of the 2004 Wireless CSI Study as evidence that "carriers may be finally catching up with customer expectations, particularly in areas where the industry has been concentrating most of its financial resources."[434] For example, the area of call quality received the largest reported increase in satisfaction ratings over 2003 - a 7 percent increase - with coverage attributes such as "making calls outside the local calling area" and "geographic size of local calling area" experiencing the largest positive changes.[435] Satisfaction with the cost of service also rose significantly, mainly due to a strong increase in "fairness in roaming charges."[436]

180. A more recent J.D. Power and Associates survey, this one focusing specifically on call quality, also shows an improvement in service quality in the past year.[437] According to the J.D. Power and Associates 2005 Wireless Call Quality Performance St[illegible],[438] the average number of initial connection problems dropped 50 percent compared to 2004, despite an increase in wireless calling volume. In particular, the study found that three out of every 100 calls includes at least one call quality

[432] *T-Mobile Offers More Details On Coverage; Consumers Get Less Static on Cellular Coverage.*

[433] *J.D. Power and Associates Reports Satisfaction With Wireless Service Providers Increases Significantly as Customers Report Higher Ratings in Call Quality and Cost-Related Attributes*, Press Release, J.D. Power and Associates, Sept. 9, 2004 ("*J.D. Power and Associates Wireless Customer Satisfaction Study*").

[434] *Id.*

[435] *Id.*

[436] *Id.*

[437] *J.D. Power and Associates Reports The Number of Wireless Calls Experiencing a Problem with Initial Connections Declines 50 Percent, Despite an Increase in Calling Volume*, Press Release, J.D. Power and Associates, Aug. 2005.

[438] *Id.* The 2005 study employs a [illegible]ll quality index based on seven customer-reported problem areas that impact overall carrier performance. These are (in order of importance): static/interference (39 percent); connection on first try (24 percent); voice distortion (12 percent); no echoes (10 percent); dropped/disconnected calls (9 percent); no immediate voice mail notification (4 percent); and no immediate text message notification (2 percent). The study is based on the experiences reported by 22,730 wireless users.

problem with the initial connection, down from six out of 100 in 2004. The senior director of wireless services at J.D. Power and Associates credits competition with the improvement: *"With an increasingly* competitive environment and an increase in calling volumes, carriers that offer superior network quality will improve their likelihood of attracting new customers and will retain more of their existing base."[439] However, the study also found that wireless call quality depends on geography, with customers who live in non-metro areas typically reporting significantly higher call quality problem rates than those who live in metro areas.[440] By way of explanation, J.D. Powers and Associates note that "coverage is typically more robust in high population areas due to the close proximity of cell towers."[441]

181. According to a USA Today/CNN/Gallup Poll conducted in March 2005, 83 percent of cellphone owners said they were "very satisfied" or "somewhat satisfied."[442] This finding compares favorably with the customer satisfaction rates found by earlier surveys of mobile phone service customers that were cited in the *Ninth Report* and previous reports.[443] Like the J.D. Power and Associates survey, however, the USA Today/CNN/Gallup Poll results indicate that cellphone users continue to experience problems. In particular, nearly half of the respondents consider dropped calls a major or minor issue, and 42 percent feel the same way about confusing bills.[444] In addition, 59 percent of respondents think service contracts that lock in for a period of time are a major or minor problem, and 53 percent feel that the cost of service is a major or minor problem.

182. Another view of service quality comes from an annual cellphone service customer satisfaction survey conducted in September 2004 by Consumer Reports magazine of some 39,000 subscribers to its Web site (ConsumerReports.org).[445] In contrast to the marked improvement in the J.D. Power and Associates customer satisfaction index from 2003 to 2004, the Consumer Reports survey found that the overall satisfaction index has changed by only one point in the past three years, from 65 to 66. Moreover, in contrast to the 83 percent customer satisfaction rate found by the USA Today/CNN/Gallup Poll, only 45 percent of respondents to the Consumer Reports survey said they were completely satisfied or very satisfied with their cellphone service. This gives cellphone service a lower level of overall customer satisfaction than most other services the magazine measures, including hotels (67 percent), supermarkets (67 percent), and homeowners' insurance (77 percent).[446] Nearly 70 percent of those who use a cellphone frequently had a least one dropped call in the week before the survey, and nearly 60 percent said they had a bad connection. Only 31 percent said the provider's response to a service inquiry was very helpful, while 40 percent said responses to billing inquiries were very helpful. The magazine asserts that these survey results explain why 35 percent of its respondents were seriously

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[439] *Id.*

[440] *Id.* The higher rate of call quality problems in non-metro areas is particularly the case with respect to dropped/disconnected calls, initial connections, static, and delayed voice mail notification.

[441] *Id.*

[442] Edward C. Baig, *Cell Phones Top List of What Gets Us Steamed*, USA TODAY, May 18, 2005 ("*Cell Phones Top List of What Gets Us Steamed*").

[443] In particular, a 2002 telephone survey conducted by the General Accounting Office found an 83 percent customer satisfaction rate, and a 2003 online survey conducted by the National Regulatory Research Institute found a 72 percent customer satisfaction rate. *See Ninth Report*, at 20674-20675; *FCC Should Include Call Quality in Its Annual Report on Competition in Mobile Phone Services*, General Accounting Office, GAO-03-501, Apr. 2003, at 27.

[444] *Cell Phones Top List of What Gets Us Steamed.*

[445] *Cellular Service*, CONSUMER REPORTS, Feb. 2005, at 18.

[446] *Cell Phones Top List of What Gets Us Steamed.*

considering switching carriers. According to the deputy editor of Consumer Reports, the survey results indicate that "the chronic problem for cellphone customers are service and billing."[447]

183. The Commission releases a report on the informal inquiries and complaints processed by its Consumer & Governmental Affairs Bureau ("CGB") four times a year. Since consumers who submit complaints are self-selected, the data in these reports are not representative of the U.S. population or mobile phone customers as a whole. The report on consumer inquiries and informal complaints during the fourth quarter of calendar year 2004 was issued on March 4, 2005.[448] Of the services regulated by the FCC, wireless services ranked third behind radio and television broadcasting and wireline telecommunications in terms of number of complaints during the reporting period. Of the 333,812 complaints registered in the fourth quarter, wireless complaints accounted for 4,369, or slightly more than 1 percent of the total. This represented a sharp decline from the 9,120 wireless complaints recorded in the third quarter of 2004.

184. Of those 4,369 complaints from wireless consumers, service quality ranked third behind billing and rates and early termination of service contracts in terms of the number of complaints during the reporting period. In particular, 2,300 of the complaints were related to billing and rates, 670 of the complaints were related to contract and early terminations issues, and 606 of the complaints were related to service quality issues, with the remaining complaints being related to carrier marketing and advertising (537 complaints) and number portability (256 complaints). For purposes of the report, service quality addresses a broad range of disputes and inquiries regarding quality of service or the lack of coverage within a geographic area served by a wireless provider, including dead zones, dropped calls, overall quality of service within the subscriber's local calling area, network busy signal, and roaming availability.

## D. International Comparisons

### 1. Mobile Voice

185. The *Ninth Report* and previous reports compared mobile market performance in the United States, Western Europe and Asia-Pacific countries of comparable income levels with regard to mobile penetration, usage, and pricing.[449] As noted in the *Ninth Report*, these comparisons have shown three consistent differences in performance between the U.S. mobile market and mobile markets abroad. First, mobile penetration is significantly higher in Western Europe and developed Asia-Pacific countries than in the United States. Second, average minutes of use per subscriber are significantly higher in the United States than in Western Europe and developed Asia-Pacific countries. Third, revenue per minute, a commonly used proxy for pricing, is significantly lower in the United States than in Western Europe and Japan.

186. More recent data confirm that the same pattern of international differences in mobile market performance continued into the year 2004.[450] Mobile penetration remains significantly higher in Western Europe and parts of the Asia-Pacific region than in the United States. Mobile penetration

[447] *Id.*.

[448] Quarterly Report on Informal Consumer Inquiries and Complaints Released, *News Release*, Federal Communications Commission March 4, 2005.

[449] *Ninth Report*, at 20676-20678. In accordance with established practice in using international benchmarking for the purpose of assessing effective competition in mobile markets, the comparison of mobile market performance is restricted to Western Europe and parts of the Asia-Pacific in order to ensure that the countries being compared are roughly similar to the United States with regard to the level of economic and telecommunications infrastructure development. *See, for example*, UK regulator Oftel's review of effective competition in the mobile market: *Effective Competition Review: Mobile*, Office of Telecommunications, Feb. 2001, at 7.

[450] *See* Appendix A, Table 10, *infra*.

averaged an estimated 95 percent in Western Europe at the end of 2004.[451] In a number of countries, including Italy, the United Kingdom, Sweden, and Portugal, mobile penetration exceeded 100 percent at the end of 2004 due to double counting of subscribers.[452] As in years past, France finished 2004 with the lowest mobile penetration rate in Western Europe at 74 percent.[453] Thus, as in previous years, U.S. mobile penetration at the end of 2004, at approximately 61 percent,[454] was lower than the lowest mobile penetration rate in Western Europe.

187. Japan finished the year with a mobile penetration level of 71 percent,[455] somewhat lower than the lowest penetration rate in Western Europe but higher than the U.S. level. In comparison, year-end mobile penetration rates in a number of other Asian-Pacific countries were within the range of European levels, including Australia (89 percent), South Korea (76 percent), Hong Kong (106 percent), and Singapore (90 percent).[456]

188. The United States continues to lead the world in usage, with average MOUs estimated to be approximately 630 per month in the fourth quarter of 2004.[457] This compares with an average across Western Europe of 137 MOUs, with most Western European countries tightly clustered in the range from 110 to 170 MOUs.[458] The exceptions include Finland (258), France (225), and, at the low end, Germany (76).[459] MOUs in comparable Asian-Pacific countries were generally higher than the Western European average, but still well below the U.S. figure, including Japan (154), Australia (168), South Korea (316),

[451] *Global Wireless Matrix 4Q04*, at 3.

[452] *Id.* As noted in previous reports, reported mobile subscriber figures and penetration may be overstated in some countries, particularly those with a high percentage of prepaid subscribers, due to double counting of subscribers who have switched service providers but have not yet been removed from their former provider's subscriber base, or those who subscribe to multiple mobile service providers and therefore have multiple SIM (Subscriber Identity Module) Cards or handsets. As one analyst report explains, carriers have widely different policies to determine when to cut off inactive subscribers and to remove them from their reported subscriber base. In addition, it is becoming more prevalent for people to subscribe to multiple mobile service providers. *Id.*, at 144. *See, also, Seventh Report*, at 13033, and *Sixth Report*, at 13391.

[453] *Global Wireless Matrix 4Q04*, at 3.

[454] The estimates of mobile penetration, MOUs, and revenue per minute in the United States cited in this section differ somewhat from estimates provided in previous sections of the report because they come from different sources. We rely on the comparative data reported in Merrill Lynch's *Global Wireless Matrix 4Q04* for this section of the report to ensure consistency with the methodology used to compile the data reported for other countries.

[455] *Id.*

[456] *Id.* In many West European and Asian countries, prepaid service along with the calling party pays regime may contribute to high mobile penetration. *See OECD Communications Outlook 2005*, at 299.

[457] *Global Wireless Matrix 4Q04*, at 3 and 8. For purposes of comparing metrics in different countries, average MOUs include both incoming and outgoing minutes, and usually exclude traffic related to mobile data services. MOUs figures are potentially somewhat overstated in the United States, and more generally in countries that do not employ calling party pays, relative to countries that do employ calling party pays, as a result of the double-counting of same-network ("on-net") mobile-to-mobile minutes. The double counting occurs because under the "mobile party pays" system used in the United States the same minute of an on-net call is billed to both the caller and the receiver. *Id.*, at 144-145.

[458] *Id.*, at 3 and 8. *See, also,* Jason Armstrong *et al., Wireless Services – Look for Another Strong Year in 2005*, Goldman Sachs, Global Investment Research, Jan. 4, 2005, at 1 (asserting that "In Europe, high call termination rates to wireless phones have effectively kept a ceiling on the minutes traversing wireless networks.").

[459] *Global Wireless Matrix 4Q04*, at 3 and 8.

Hong Kong (387), and Singapore (282).[460]

189. Revenue per minute[461] in Western Europe averaged $0.26 in the fourth quarter of 2004, and ranged from a high of $0.53 in Switzerland to a low of $0.16 in Finland, with most countries clustered in the range between $0.18 and $0.30.[462] At $0.08, average revenue per minute in the United States during the same period was therefore less than one-third of the European average and half the lowest revenue per minute in Western Europe.[463]

190. At $0.32, revenue per minute in Japan was four times the U.S. figure at the end of 2004 and also higher than the European average, but lower than the European highs of $0.53 in the Swiss mobile market and $0.35 in the German mobile market.[464] In contrast, revenue per minute was nearly as low in some Asian countries as in the United States, including South Korea ($0.10) and Singapore ($0.10).[465] The only developed country with a lower revenue per minute than the United States was Hong Kong, at $0.06.[466]

191. One of the reasons revenue per minute is higher in Western Europe than in the United States is that the calling party pays system used throughout Western Europe tends to produce higher mobile termination rates, and consequently higher charges for calls to mobile phones, than the mobile party pays system used in the United States.[467] Apart from the effects of calling party pays, however, this difference in the pricing of mobile telephone service is widely attributed to a less aggressive competitive environment in Western European mobile markets for services paid for by mobile subscribers.[468] Accordingly, the results of this international comparison can be interpreted as evidence that the U.S. mobile market is effectively competitive relative to mobile markets in Western Europe and also Japan.

### 2. Mobile Data

192. The *Ninth Report* and previous reports observed that the percentage of mobile service revenues from data services is significantly higher in Western Europe than in the United States.[469] This difference in mobile data performance continued into 2004. In the fourth quarter of 2004 revenues from mobile data services contributed an estimated 16 percent of European mobile carriers' ARPU on average, and ranged from 7 to 21 percent of ARPU in individual European markets.[470] This compares with 6

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[460] *Id.*, at 3.

[461] Revenue per minute is calculated by dividing monthly voice-only ARPU by MOUs. For purposes of international comparison, service revenues included in ARPU reflect the fees mobile operators collect from other network operators for terminating incoming calls on their networks as well as monthly service charges and usage fees paid by mobile subscribers. *Id.*, at 145.

[462] *Id.*, at 3 and 8.

[463] *Id.*, at 3.

[464] *Id.*

[465] *Id.*

[466] *Id.*

[467] *Ninth Report*, at 20679; *Seventh Report*, at 13037. *See, also,* Jason Armstrong *et al., Wireless Services – Look for Another Strong Year in 2005*, Goldman Sachs, Global Investment Research, Jan. 4, 2005, at 1.

[468] *Ninth Report*, at 20678-20679; *Eighth Report*, at 14869-14871; *Seventh Report*, at 13036.

[469] *Ninth Report*, at 20680.

[470] *Global Wireless Matrix 4Q04*, at 3.

percent of U.S. mobile carriers' ARPU in the same period, double the previous year's figure.[471] The percentage of ARPU derived from mobile data services was even higher in Japan (24 percent) than in Western Europe.[472] Text messaging, or SMS, continues to be the most popular mobile data service in Western Europe, accounting for an estimated 90 percent of European operators' data revenues.[473] One analyst estimates that about 71 percent of European cellphone users send text messages, more than twice the percentage in the United States.[474] As noted in the *Ninth Report*, one of the reasons Western Europe leads the United States in mobile data usage is that mobile voice is still relatively expensive on a per minute basis in Europe compared to the United States.[475] European mobile subscribers are more likely to opt for text messaging because it is cheaper than placing a call on their mobile phones.[476] In contrast, most U.S. mobile subscribers are on calling plans that include large buckets of minutes and are more likely to make a phone call because the incremental cost of a call is close to zero.[477]

193. The number of foreign mobile telephone carriers providing mobile data services over next-generation networks continued to grow in the past year. As noted in the *Ninth Report* and previous reports, while the European Commission had originally targeted the beginning of 2002 as the date for the coordinated introduction of 3G services, European carriers had delayed the launch of commercial WCDMA service until 2003 at the earliest and in most cases 2004.[478] As of the end of 2003, commercial start-up of WCDMA service in Europe was limited to a small number of carriers in a handful of markets, including Austria, Denmark, Italy, Luxembourg, Sweden and the United Kingdom.[479] In contrast, by the end of 2004 at least one WCDMA network had been launched in nearly all Western European markets, and three or more WCDMA networks had been launched in a number of markets, including Austria, Germany, Greece, Italy, Portugal, and the United Kingdom.[480] Even though commercial 3G services are now widely available in Western Europe, analysts and experts continue to stress that consumer use of new services may be limited in the near term due to problems such as download speeds that are much slower than theoretical speeds, patchy coverage (especially inside buildings), and lack of "killer applications" that could drive demand for 3G services.[481]

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[471] *Id.*; *Ninth Report*, at 20680.

[472] *Global Wireless Matrix 4Q04*, at 3.

[473] Brian Lagrotteria, *R U There?*, WALL STREET JOURNAL, Feb. 14, 2005.

[474] Li Yuan, *Text Messages Sent by Cellphone Finally Catch on in U.S.*, WALL STREET JOURNAL, AUG. 11, 2005.

[475] *Ninth Report*, at 20680.

[476] Frank J. Governali *et al.*, *Wireless Data Prospects Brightening*, Goldman Sachs, Global Investment Research, Apr. 16, 2004, at 12.

[477] *Id. See, also, Text Messages Sent by Cellphone Finally Catch on in U.S.*. As noted in the *Ninth Report*, the more rapid spread of mobile data services in overseas markets than in the United States may reflect a variety of factors influencing the demand for mobile data services, including differences in the age composition of the mobile subscriber base, the degree of technological standardization and compatibility among competing mobile networks, the availability of more advanced handsets, wireline Internet penetration rates, and the relative prices of mobile voice, mobile data, and wireline Internet access. See *Ninth Report*, at 20680.

[478] *See Ninth Report*, at 20681.

[479] *Id.*

[480] *Global Wireless Matrix 4Q04*, at 11.

[481] David Pringle, *Not So Fast*, WALL STREET JOURNAL, Feb. 14, 2005; David Pringle, *Slower Growth Hits Cellphone Services Overseas*, WALL STREET JOURNAL, May 23, 2005; Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 6-7.

194. Japan's NTT DoCoMo launched the world's first commercial 3G service over a WCDMA network in October 2001.[482] As noted in the *Ninth Report*, after two years of relatively sluggish growth, consumer uptake of NTT DoCoMo's WCDMA service, which the company calls FOMA (Freedom of Multimedia Access), picked up speed in late 2003 and the first half of 2004. Rapid adoption of FOMA continued through early 2005, with the number of FOMA subscribers surpassing 12.2 million as of the end of April 2005, up from nearly 3.6 million a year earlier.[483] However, because rival Japanese carrier KDDI's CDMA2000 1xRTT-based service enjoyed a rapid adoption rate from the time it was launched in April 2002, NTT DoCoMo's WCDMA service has yet to close the gap. The number of subscribers to KDDI's CDMA2000 service rose to more than 18.2 million at the end of April 2005, up from nearly 14 million the previous year.[484] KDDI's CDMA2000 subscribers now represent more than 92 percent of its total subscriber base, whereas FOMA subscribers represent nearly a quarter of NTT DoCoMo's total subscriber base. KDDI's packet data service using 1xEV-DO, which was introduced in November 2003, also appears to enjoy a relatively rapid adoption rate, with an estimated 2.55 million subscribers, or about 13 percent of KDDI's total subscriber base, by the end of February 2005.[485] Data services offered over next-generation CDMA networks continue to be popular with consumers in Korea. South Korea had accumulated a total of over 33 million CDMA2000 subscribers, representing 90 percent of South Korea's total mobile telephone subscriber base, through December 2004, about 10 million of which are using services offered over CDMA2000 1xEV-DO networks.[486]

## VII. INTERMODAL ISSUES

### A. Wireless – Wireline Competition

195. Once solely a business tool, wireless phones are now a mass-market consumer device.[487] As the Economist magazine recently noted, "When you leave your house, you probably take your keys, your wallet and your phone."[488] The overall wireless penetration rate in the United States is now at 62 percent, [489] and more than 90 percent for the U.S. population between the ages of 20 and 49.[490] According to one study, two-thirds of all U.S. households have at least one cellphone, with many having more than one.[491]

#### 1. Wireless Substitution

196. Total wireless substitution has grown significantly in recent years. According to a 2004

[482] *Ninth Report*, at 20681.

[483] Telecommunications Carriers Association ("TCA"), *Number of Subscribers* (visited May 24, 2005) <http://www.tca.or.jp/eng/database/daisu/index.html>.

[484] *Id.*

[485] Paul Wuh et *al.*, *DoCoMo Gets 10mn 3G WCDMA Subscribers*, Lehman Brothers, Equity Research, Mar. 8, 2005, at 1.

[486] *3G Subscribers*, 3G TODAY, (visited May 24, 2005) <http://www.3gtoday.com/subscribers/index.html>.

[487] *See Sixth Report*, at 13381. One analyst estimated that, in 2004, only 25 percent of wireless users were business customers, with the remaining 75 percent being consumers. *10-Year Wireless Projections*, KAGAN WIRELESS TELECOM INVESTOR, June 6, 2005, at 2.

[488] *A Spiritual Connection*, ECONOMIST, Mar. 10, 2005.

[489] *See* Section VI.B.1, Subscriber Growth, *supra*.

[490] *Diamond in the Rough*, at 4.

[491] *More Cell Phones, Less Satisfaction*, CNET NEWS.COM, Apr. 13, 2005 (citing a Forrester Research study).

survey done for the Centers for Disease Control (CDC), 5.5 percent of adults lived in households with only wireless phones in the second half of 2004, up from 4.4 percent in the first half of 2004 and 2.8 percent in the first half of 2003.[492] The rate among younger users appears much higher, with roughly 14 percent of 18-24 year-olds living in wireless-only households. According to one analyst, most wireless-only users do not actually cancel their wireline service; instead, they simply never sign up for wireline when making an initial phone service decision.[493]

197. Even when not "cutting the cord" completely, consumers appear increasingly to choose wireless service over traditional wireline service, particularly for certain uses. A recent study showed that one-third of all households receive more than half of their calls on wireless phones, with 9 percent receiving almost all their calls wirelessly.[494] In the *Ninth Report*, we discussed the pressures that wireless growth is placing on companies which offer wireline services.[495] In 2004 these trends continued, as the number of landlines declined by around 1.2 percent quarterly in the second and third quarters of 2004, and wireline long distance voice revenues continued to erode.[496] At the end of 2004, there were more wireless subscribers than wireline in the United States - 176 million access lines versus more than 184 million wireless subscribers.[497] In response, some incumbent wireline companies are beginning to focus more on their fast-growing wireless businesses,[498] where, nationwide, service revenues grew by 12 percent in 2004.[499] One wireline executive remarked, "We are not looking at ourselves as a phone company anymore."[500]

198. These trends appear to be due to the relatively low cost, widespread availability, and increased use of wireless service. As we discussed in past reports, a number of analysts have argued that wireless service is cheaper than wireline, particularly if one is making a long-distance call or when traveling.[501] As one analyst put it more recently, "For many customers, wireless is cheaper with greater

[492] Stephen Blumberg, *Household Telephone Service and Usage Patterns in the US in 2004,* data presented at "U.S. Household Telephone Usage Patterns In 2004: A Focus on Cell Phone Usage," seminar hosted by the Bureau of Labor Statistics, Washington, DC, Jun. 16, 2005. Another recent study found that 6 percent of U.S. households are wireless only. Clyde Tucker, *Household Telephone Service and Usage Patterns in the United States in 2004,* data presented at "U.S. Household Telephone Usage Patterns In 2004: A Focus on Cell Phone Usage," seminar hosted by the Bureau of Labor Statistics, Washington, DC, Jun. 16, 2005.

[493] Jason Armstrong *et al., Americas: Telecom Wireless,* Goldman Sachs, Equity Research, Jan. 4, 2005, at 1.

[494] This percentage includes wireless-only households. Clyde Tucker, *Household Telephone Service and Usage Patterns in the United States in 2004*, data presented at "U.S. Household Telephone Usage Patterns In 2004: A Focus on Cell Phone Usage," seminar hosted by the Bureau of Labor Statistics, Washington, DC, Jun. 16, 2005.

[495] *See Ninth Report*, at 20684.

[496] Jesse Drucker, Almar Latour, and Dennis Berman, *Taking no Giants, Sprint Nextel Seeks to Exploit Wireless Growth,* WALL STREET JOURNAL, Dec. 16 2004, at A1; Anne Marie Squeo, *In Tiny Towns, Call Options Shake Up an Old Phone System*, WALL STREET JOURNAL, Feb. 22, 2005, at A1.

[497] Timothy Horan *et al.*, *Transfer of Coverage: We Favor Wireless and Cable Over Wireline*, CIBC World Markets, Equity Research, May 3, 2005, at 2.

[498] Jesse Drucker, Almar Latour, and Dennis Berman, *Taking no Giants, Sprint Nextel Seeks to Exploit Wireless Growth,* WALL STREET JOURNAL, Dec. 16 2004, at A1; Almar Latour and Shawn Young, *Verizon Consides Shedding Portion Of Its Local Lines,* WALL STREET JOURNAL, Oct. 29, 2004; COMMUNICATIONS DAILY, Oct. 22, 2004.

[499] *US Wireless Matrix 4Q04*, at 21.

[500] Christopher Rhoads, *Outside the Lines*, WALL STREET JOURNAL, Sept. 13, 2004, at R6.

[501] *See Eighth Report*, at 14832-14833; *Ninth Report*, at 20684-20685.

utility than wireline – in contrast to perceptions, wireless prices have indeed been falling, making it more competitive with wireline."[502] The analyst later added:

> For your mere $40 or $50 or $60 plan with mega-minutes, you also get voice mail, caller ID, 3-way calling, call waiting, and call forwarding thrown in. On the wireline these features will cost you between $15 to $20. And don't forget, you get mobility to boot. Who cares if the call gets dropped once in a while. The utility is great![503]

### 2. Wireless Alternatives

199. The number of mobile wireless carriers offering service plans designed to compete directly with wireline local telephone service continues to increase. These plans offer unlimited local calling for around $30 to $40 a month.[504] The largest of such providers, Leap, under its "Cricket" brand, offers mobile telephone service in 39 markets in 20 states.[505] At the end of 2004, Leap had over 1.5 million customers.[506] Leap claims that 52 percent of its customers do not have a wireline phone at home, up from 43 percent one year ago.[507] In addition, 93 percent of Leap customers use the service as their primary phone.[508] According to Leap, its customers average approximately 1,500 minutes of use per month.[509] MetroPCS, which began offering a similar unlimited calling plan in 2002, had 1.5 million customers as of February 2005.[510] MetroPCS offers service in California, Florida, and Georgia.[511]

200. As discussed in the *Ninth Report*, such unlimited local wireless calling plans are now common.[512] No fewer than 17 regional and local competitors offered similar plans in [illegible] states.[513] In addition, in 2005, many national carriers expanded calling plans that are effectively unlimited, with 1,000 "anytime" minutes and unlimited night and weekend minutes for around $40-$65 per month.[514] One analyst commented on the recent addition of "bells and whistles," such as text messaging and long-distance service, into these plans, "as carriers seek to provide customers a comprehensive alternative to

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[502] Frank Governali *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Aug. 9, 2004, at 2.

[503] *Id.*

[504] John Byrne, *Unlimited Local Plans Poliferate*, KAGAN WIRELESS MARKET STATS, Oct. 15, 2004, at 2.

[505] *Leap Reports Results for Fourth Quarter and Full Year 2004*, News Release, Leap, May 11, 2005.

[506] *Id.*

[507] *Leap Blows Away Industry Average for Landline Displacement*, News Release, Leap, Mar. 14, 2005.

[508] *Id.*

[509] *Id.*

[510] *MetroPCS Announces Signing of 1.5 Millionth Customer*, News Release, MetroPCS, Feb 28, 2005.

[511] *See* MetroPCS, *more about metroPCS* (visited May 23, 2005) <http://www.metropcs.com/about/moreaboutmetropcs.shtml>.

[512] *See Ninth Report*, at 20685-20686.

[513] John Byrne, *Unlimited Local Plans Poliferate*, KAGAN WIRELESS MARKET STATS, Oct. 15, 2004, at 2-3. *See, also,* Cricket, *Cell Phone Specials* (visited May 23, 2005) <http://www.mycricket.com/>.

[514] *See*, e.g.,T-Mobile, *Get the Nation's Most Whenever Minutes with the free Motorola V188* (visited May 23, 2005) < http://www.t-mobile.com/promos/online/1000min6010/>; Cingular, *Mobile Phone Deals & Cellular Service Plans that Fit you Best!* (visited May 23, 2005) < http://www.cingular.com/>; and Verizon Wireless, *America's Choice* (visited May 23, 2005) < http://www.verizonwireless.com/b2c/index.jsp>.

*wired service."*[515]

### B. Wireless Local Area Networks

201. Wireless Local Area Networks[516] are playing an increasingly important role as a competitor and supplement to the services offered by the CMRS industry.[517] WLANs enable consumers to obtain high-speed wireless Internet connections within certain locations at a range of 150 to 250 feet.[518] The most prevalent WLAN technology is equipment manufactured in accordance with the IEEE 802.11 family of standards, commonly known as "Wi-Fi," short for wireless fidelity. Basic WLAN data transfer rates range from speeds of up to 11 Mbps for 802.11b and up to 54 Mbps for 802.11a and 802.11g. Two Wi-Fi manufacturers, D-Link and Netgear, are currently offering rebates which make the effective purchase price of an 802.11g card, a faster standard, less than the price of a slower 802.11b card.[519] New "SpeedBoost" or "Super G" routers, marketed as "pre-802.11n," employ MIMO (Multiple Input Multiple Output) technology, making them capable of providing speeds of up to 108 Mbps.[520]

202. WLAN users can get high-speed Internet connections at so-called "hot spots," including locations such as restaurants, coffee shops, hotels, airports, convention centers, and city parks, streets, and squares.[521] Estimates on the number of public Wi-Fi hot spots vary considerably. Wi-Fi411 estimates 12,509 in the United States.[522] However, Intel's website counts 25,877 Wi-Fi locations in United States.[523] The Gartner Group predicts there will be more than 150,000 hotspots worldwide by the end of 2005.[524] Gartner has also estimated that the number of hotspot users worldwide will total 30 million by the end of 2004, up from 9.3 million in 2003 and 2.5 million in 2002.[525] The use of WLANs to access the Internet is becoming so common, that, according to one estimate, 75 percent of all laptop computers being shipped today have Wi-Fi built-in as original equipment.[526]

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[515] John Byrne, *Unlimited Local Plans Poliferate*, KAGAN WIRELESS MARKET STATS, Oct. 15, 2004, at 2.

[516] For a comprehensive discussion of WLAN technologies and deployment, *see, generally, Wireless Broadband Access Task Force Report.*

[517] Services provided over WLANs are not CMRS services. *See* 47 C.F.R. §§ 20.3, 20.9 for a discussion of commercial mobile radio services. WLANs are permitted to operate on an unlicensed basis under Part 15 of the FCC's rules. *See* 47 C.F.R. §15, et seq.

[518] Kenneth R. Carter, Ahmed Lahjouji, and Neal McNeal, Unlicensed and Unshackled: A *Joint* OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues, OSP Working Paper #39, May 2003, at 28-29. ("*OSP-OET White Paper*")

[519] *See* Doug Mohney, *802.11b on edge of extinction: Bye bye Sooty, bye bye*, THE INQUIRER, Apr. 11, 2005. <http://www.theinquirer.net/?article=22443>.

[520] *Id.*

[521] *See Seventh Report*, at 13062-13063. Hot spots typically rely on high-speed landline technologies, such as T-1 lines, DSL, or cable modems, to connect to the PSTN and Internet.

[522] *See* <http://www.wifi411.com/> (visited May 18, 2005).

[523] *See* <http://intel.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1> (visited May 18, 2005).

[524] *Wireless Broadband Access Task Force Report*, at 30-31.

[525] *Id.*, at 30; *Gartner Says the Number of Hotspot Users Worldwide to Triple in 2004*, Press Release, Gartner, Inc., Feb. 18, 2004.

[526] See Corilyn Shropshire, *Why Pay for Wi-Fi? As Wireless Internet Hot Spots Proliferate, So Do Demands for Free Service*, PITTSBURGH POST-GAZETTE, Feb. 7, 2005.

203. As noted in the *Ninth Report*, several mobile telephone carriers have entered the hot spot operation business through acquisitions, partnerships, or independent deployments.[527] Generally, mobile telephone carriers offer WLAN services to augment their voice service offerings with data access.[528] Subscribers to carriers' WLAN services may choose from a wide range of service plans including annual access, month-to-month access, daily access, and metered access.[529] In the past year mobile carriers continued to extend their Wi-Fi coverage by entering into agreements with other carriers. T-Mobile now claims 5,675 hotspots where its customers can get connectivity.[530] Nextel is partnering with Boingo Wireless and Wayport, and claims about 7,000 hotspots.[531] Sprint reports that it offers service at 19,000 hotspots through roaming agreements.[532] In May 2003, Verizon Online announced that it would upgrade 200,000 pay phones in Manhattan to offer free Wi-Fi as a free add-on for its residential broadband DSL subscribers.[533] More recently, however, Verizon Wireless announced that the company would expand its CDMA2000 1xEV-DO service in New York City and begin to phase out its some 360 Wi-Fi payphone hotspots for its online Internet access customers.[534]

## VIII. CONCLUSION

204. Even with fewer nationwide mobile telephone carriers to choose from, U.S. consumers continue to benefit from robust competition in the CMRS marketplace. During 2004, the CMRS industry experienced another year of growth, demonstrating the continuing demand for and reliance upon mobile services. As of December 2004, we estimate there were approximately 184.7 million mobile telephone subscribers, which translates into a nationwide penetration rate of roughly 62 percent.[535] Consumers continue to increase their use of mobile telephones for both voice and data services. Partly because of the prevalence of mobile service packages with large buckets of inexpensive minutes, the average amount of time U.S. mobile subscribers spend talking on their mobile phones rose to 580 minutes per month in the

[527] *Ninth Report*, at 20687.

[528] See *Wireless Broadband Access Task Force Report*, at 74.

[529] *See, for example*, Sprint PCS, *PCS for Business: Voice and Data* (visited May 20, 2004) <https://wifi.sprintpcs.com/signup/terms.aspx>; T-Mobile, *T-Mobile Hotspot: Service Plans* (visited May 20, 2004) <https://selfcare.hotspot.t-mobile.com///services_plans.do>.

[530] *See, for example*, T-Mobile, *T-Mobile Hotspot U.S. Location Map* (visited May 18, 2005) <http://locations.hotspot.t-mobile.com/>. The Nextel hotspot service alone is available for laptops for a monthly fee of $39.99. With Wireless PC Access added, the service is charging a promotional rate of $54.99 per month (visited May 18, 2005) <http://nextelonline.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml>.

[531] *See, for example*, T-Mobile, *T-Mobile Hotspot U.S. Location Map* (visited May 18, 2005) <http://locations.hotspot.t-mobile.com/>. The Nextel hotspot service alone is available for laptops for a monthly fee of $39.99. With Wireless PC Access added, the service is charging a promotional rate of $54.99 per month (visited May 18, 2005) http://nextelonline.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml

[532] *Sprint Extends Wi-Fi Leadership and Broadband Footprint Globally*, Press Release (visited May 18, 2005) <http://www2.sprint.com/mr/news_dtl.do?id=6320> Sprint PCS offers pay-as-you-go Wi-Fi access for $9.95 for 24 hours of unlimited usage in a supported location. It also has a month-to-month plan for $49.95 (visited May 18, 2005) <http://www.sprint.com/business/products/products/sprintPCSWI-FIAccess_tabB.jsp>.

[533] Ryan Naraine, *Verizon Plans to 'Wi-Fi' Pay Phones*, 802.11 Planet <http://www.80211-planet.com/news/article.php/2204901>.

[534] *Verizon Wireless Answers the Mayor's Call: Accelerates Expansion of Wireless Broadband Network in New York City and Metro Region*, Press Release, Verizon Wireless, Apr. 27, 2005 (visited May 18, 2005) <http://news.vzw.com/news/2005/04/pr2005-04-27a.html>.

[535] *See* Section, Section VI.B.1, Subscriber Growth, *supra*.

second half of 2004, an increase of more than an hour from a year earlier and more than triple the average usage of mobile subscribers in Western Europe and Japan.[536] Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages, SMS traffic volume grew to 4.66 billion per month in December 2004, more than double the 2 billion messages per month reported in December 2003.[537] Relatively low prices on mobile voice and data services appear to have been a key factor stimulating subscriber growth and usage. While only two of three different indicators of mobile pricing showed a continued decline in the cost of mobile service in 2004,[538] mobile telephone service in the United States remains relatively inexpensive on a per minute basis compared with that in Western Europe.[539]

205. In addition to the indicators of mobile market performance cited in the preceding paragraph, a wide variety of indicators of carrier conduct and market structure also show that competition in mobile telecommunications markets is robust. For example, mobile telephone providers continued to build out their networks and expand service availability during 2004.[540] Carriers also continued to deploy networks based on CDMA2000 1xEV-DO or WCDMA technologies that allow them to offer mobile Internet access services for mobile telephone handsets, PDAs, and laptops at speeds comparable to what many users get from fixed broadband connections such as DSL. With respect to market structure, the merger of Cingular Wireless and AT&T Wireless has resulted in the first decline in the number of nationwide carriers since the Commission started compiling these reports.[541] Due largely to this transaction, there was a sharp decline in the percentage of the U.S. population living in counties with access to six or more different mobile telephone operators as compared with the previous year. Nevertheless, despite the reduction in the number of nationwide carriers from six to five, 97 percent of the total U.S. population continues to live in counties where three or more different operators compete to offer mobile telephone service in some parts of those counties, while 93 percent of the U.S. population continues to live in counties with four or more mobile telephone operators competing to offer service, and 87 percent of the U.S. population continues to live in counties with five or more competing mobile telephone operators.[542]

206. In addition, while relatively few wireless customers have "cut the cord" in the sense of canceling their subscription to wireline telephone service, consumers appear increasingly to chose wireless service over traditional wireline service, particularly for certain uses. A recent study showed that one-third of all households receive more than half of their calls on wireless phones, with 9 percent receiving almost all their calls wirelessly.

207. Using the various data sources and metrics discussed above, we have met our statutory requirement to analyze the competitive market conditions with respect to commercial mobile services,[543]

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[536] *See* Section VI.D.2, Minutes of Use, *supra*, and VI.E, International Comparisons, *supra*.

[537] *See* Section VI.B.1, Subscriber Growth, *supra*, and Section VI.B.3, Mobile Data Usage, *supra*.

[538] *See* Section VI.A.1, Pricing Trends, *supra*.

[539] *See* Section VI.E, International Comparisons, *supra*.

[540] *See* Section IV.B.1, Technology Deployment and Upgrades, *supra*.

[541] As noted earlier, the Sprint-Nextel and Alltel-Western Wireless mergers closed too recently for their effects to be reflected in the indicators of market structure, carrier conduct, and market performance. The structural changes resulting from these transactions, and their potential impact on carrier conduct and market performance, will be reflected in future reports.

[542] *See* Appendix A, Table 9, *infra*.

[543] *See* Section II.A, Background, *supra*.

and conclude that the CMRS marketplace is effectively competitive.

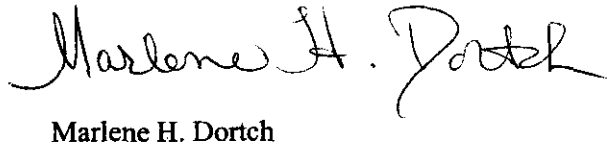
## IX. ADMINISTRATIVE MATTERS

208. This Tenth Report is issued pursuant to authority contained in Section 332 (c)(1)(C) of the Communications Act of 1934, as amended, 47 U.S.C. § 322 (c)(1)(C).

209. It is ORDERED that the Secretary shall send copies of this Report to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

210. It is FURTHER ORDERED that the proceeding in the WT Docket No. 05-71 IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION



Marlene H. Dortch
Secretary